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Machine Evaluation  
Dosimetry and Smoke  
Fractionation

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THE COUNCIL FOR TOBACCO RESEARCH-U.S.A., INC.

March 4, 1975

To: The Scientific Advisory Board of The Council for Tobacco Research - U.S.A., Inc.

Subject: Oak Ridge National Laboratory (CTR Contract No. C15B).  
"Smoking Machine Evaluation, Animal Dosimetry and Smoke Fractionation Progress"

Oak Ridge, under CTR Contract No. 15 has been developing test methods and technology, analyzing and evaluating smoking machines for a number of parameters of central concern to the smoke inhalation program. As you are aware, the smoking machines have improved greatly in function and sophistication in the last two-year period, significantly as a result of Dr. Guerin's and Dr. Stokely's interest in this program and their ready collaboration with other investigators in and out of CTR.

Currently, as can be seen by the attached progress report and projected outline of the next year, they are investigating the chemistry and particulate characteristics of smoke produced in the Walton and P&I Sem I Prototypes. Some studies of smoke produced in the Lorillard LACS II are also anticipated once it is operational.

A large body of data has been accumulated, and they have begun to write a series of papers on relevant topics. These include vertical versus horizontal smoking, positive versus negative puffing; effects on smoke chemistry, particle size distribution in various machines using various assay measures, description of methods to characterize intermittent and continuous smoke generator machines, effects of interfaced animals and chamber constituent depletion, and several general papers on smoke chemistry and machine characteristics. Collaboratively several papers are possible in conjunction with Dr. Whitmire at MA, Dr. Essman at Queens College, Dr. Greenspan and Mr. Florant at P&I.

For the next year some additional assistance will be required to optimally develop the P&I Semi II model. It would not have been possible to design and build the Sem I in such a short span (since last January) without such a collaborative effort among CTR contractors. Extensive dosimetry studies, collaboratively with Drs. Whitmire, Kouri, Demoise at MA, and taking advantage of the analytical techniques developed in this program, are underway to define localized tissue content of smoke particulate and gas phase constituents. These studies will study different mouse strains on varied multiple smoke exposure regimens.

Lastly, a small pilot project to initiate subfractionation of smoke condensate at no great cost would be begun. This program would not be extensive but should investigate feasibility of adopting technology currently applied to petroleum fractionation to our problems. It should

1003536804

be clearly understood that this would be preliminary and not the extensive and more definitive column chromatography, mass spectrographic program required to get answers rapidly in the future. Inasmuch as a preliminary program can give leads, it will be useful. Hopefully, some fractions could be tested for biological effects, such as IT and SC. cocarcinogenesis, AHH induction, *S. typhimurium* mutagenesis and specific tissue culture cell transformations.

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